

Classification of Solar Prominences for Sunspot Cycle No. 19 - 1958

BY

DONALD H. MENZEL AND F. SHIRLEY JONES

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Solar Department of Harvard College Observatory
Cambridge 38, Massachusetts

Contract No. AF19(604)-4962
Project No. 7649
Task No. 764901

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Prepared for

AIR FORCE CAMBRIDGE RESEARCH LABORATORIES
OFFICE OF AEROSPACE RESEARCH
UNITED STATES AIR FORCE
BEDFORD, MASSACHUSETTS

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Page 127, lines 6-10 (defective printing) should read:

together, for each third of the year. All types show considerably larger areas than were found for the 1954 prominences.

With less than 1 percent of the total areas unclassed we find that of those classified, 88 per cent were assigned to A-type classes in which the prominence material moves downward

Page 127, line 11, for 23 per cent read 15 per cent.

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SUNSPOT CYCLE NO. 19 - 1958

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ABSTRACT

This report contains a tabulation and analysis of the behavior classification of prominences observed during 1958 at the Sacramento Peak Observatory, Sunspot, New Mexico.

Similar studies for the years 1955, 1956, and 1957 have appeared under this contract as Scientific Reports No. 13, 16, and 17, respectively. A summary report for the analysis of the preceding cycle was issued as Scientific Report No. 12, "Classification of Solar Prominences--XII--Summary for 1944 to 1954."

The research reported in this paper has been sponsored by the Air Force Cambridge Research Laboratories, Office of Aerospace Research, under Contract AF19(604)-4962.

INTRODUCTION

The observations used in this research consist of the complete set of prominence surveys and motion picture films of solar prominences made at the Sacramento Peak Observatory, Sunspot, New Mexico, during 1958. We are grateful to Dr. John W. Evans, Director of the Sacramento Peak Observatory, for permitting us to use the original survey films.

Table I contains the measures of position and area, the intensity estimates, and the classification according to the Menzel and Evans scheme (1953) with the addition of the classes ASa (coronal rain in spot areas) and ANe (suspended clouds not associated with sunspots), of all prominences in the survey.

Column 1 gives the date of the observations. Column 2 indicates the amount of spread, in terms of the position angles marked by the beginning and end of each prominence. A spread of 1° indicates the position only of each of the narrower prominences, some of which are less than 0.5° in width. Column 3 gives the latitude of the center of intensity.

Column 4 indicates the "importance" of the prominence by an assigned letter giving a rough measure of the total intensity, from D- for the most insignificant through A+ for the most impressive prominences. Column 5 records the area of the prominence, expressed in standard prominence units.

Column 6 contains the class. Doubtful classifications are followed by a question mark. Non-spot prominences so adjacent to spot prominences as to suggest association with the spot are noted by asterisks. Column 7 gives additional comments.

Table II gives the classifications for the prominences in the motion picture films. The columns show date, position angle of the center of the frame, classification, and additional comments.

TABLE I
1958 SACRAMENTO PEAK PROMINENCE SURVEYS

Date	Spread	Lat. of Center of Intensity ^o	Impor- tance	Area in p.u.	Class	Comments
1958						
Mar. 18	335-22	N63	A	2050	ANd	
	32-43	S31	D	100	ANc	Streamer
	40-44	N22	D-	35	ANd	
	50-53	N13	D	95	ANd	
	65-71	S3	D+	135	ANd	
	81-107	S23	A-	1450	ANc	Streamer
	108-119	S48	D+	120	ANd	Streamer
	127-128	S62	D-	15	ANc	
	157-159	S82	D	55	ANm	
	165-168	S76	D-	20	ANm	
	185-204	S48	D-	35	BNs [?] s	
	212-216	S32	D-	15	BNs [?] s	
	225-228	S18	D	40	ANm	
	233-249	S8	C	250	ANd	
	254-263	N14	D	100	BSs	
	254-268	N16	D	80	ASa	
	260-262	N16	D	75	ASf	
	270-276	N28	D	70	ANd	
	280-296	N41	C	230	ANd	
	303-311	N62	C-	185	ANd	
Mar. 21	334-344	N82	D-	15	BNs [?] s	
	344-412	N69	B	900	ANd	Streamers
	5-29	N51	D-	25	BNs [?] s	
	33-35	N31	D-	20	ANc	
	45-50	N17	D+	145	ASf	
	49-54	N13	D+	70	BSs	
	54-65	N5	D	95	ANd*	
	66-94	S19	B+	1200	ANd	
	94-98	S31	D-	50	ASa	
	96-102	S33	D	65	ANd*	
	96-99	S33	D	50	ANe*	
	102-121	S46	A	1800	ANd*	Streamers
	123-159	S74	D	90	BNs [?] s	
	163-198	S63	D	100	BNs [?] s	
	203-215	S37	C	260	ANd	
	218-233	S18	B-	500	ANd	Streamers
	233-242	S8	D-	20	BNs [?] s	
	244-259	N7	C-	175	ANd	
	260-267	N19	D-	25	BNs [?] s	
	274-279	N31	C-	150	BSs?	or ANm?
	279-291	N42	D	70	ANd	
	296-311	N63	D	90	ANd	

Date	Spread	Lat. of Center of Intensity°	Import- tance	Area in p.u.	Class	Comments
1958						
Mar. 23	28-38	N42	C+	450	ANd	
	40-45	N31	D	120	ANd	
	68-70	85	D-	20	ANc	
	74-88	S15	B-	500	AS1	
	84-93	S26	D+	110	BSs, ^s	
	94-101	S32	D	45	ANd*	
	109-117	S48	B	450	ANd*	
	117-118	S53	D-	15	BSs	
	123-148	S70	D-	35	BNs, ^s	
	150-157	S83	D	75	ANd	
	161-194	S67	D-	20	BNs, ^s	
	199-205	S43	C	200	ANd	
	217-250	S10	D-	40	BNs, ^s	
	270-286	N34	C-	175	ANd	
	282-303	N44	B-	550	ANe	
	307-320	N69	C-	175	ANd	
Mar. 31	354-355	N68	D-	10	BNs	
	1-6	N60	D+	100	ANm	
	20-24	N42	D-	50	ANd	
	25-30	N36	D+	160	ANc	
	36-39	N27	D	35	BSs	
	39-42	N24	D	25	ASa	
	39-42	N24	D	85	ASf	
	42-55	N16	C	280	ANc*	
	58-59	N5	D-	20	ASa?	
	60-64	N2	D-	40	AS1?	
	72-76	S9	D	55	ANd	
	91-96	S29	D	100	ANd	
	122-128	S61	D-	20	BNs, ^s	
	130-131	S67	D-	15	ANb, ^s	
	135-142	S74	D-	15	BNs, ^s	
	148-165	S83	C+	250	ANd	
	177-178	S65	D-	15	BNs	
	199-200	S44	D-	25	BNs?	
	229-232	S13	D-	30	ASa	
	233-235	S10	D-	20	BSs	
	240-249	0	C	220	BSs	
	258-276	N29	C	260	AS1	
	276-281	N35	C	240	BSs	
	295-296	N52	D-	25	ANb	
	301-317	N62	B-	650	ANd	
	325-329	N80	D-	15	BNs, ^s	

P.A. 135° to 360° missing

Date	Spread	Lat of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
Apr.19 p.m.	335-2 12-16 25-29 31-34 36-40 56-66 75-91 83-94 101-104 110-115 151-166 199-215 231-234 232-235 236-237 245-248 259-262 266-275 274-288 294-303 307-312 318-332	N73 N50 N37 N32 N26 N5 S20 S24 S39 S50 S75 S41 S11 S10 S8 N3 N17 N27 N36 N53 N65 N78	A D- D D- D+ D+ D- D- D+ D D- B D D- D- D- C+ C+ D+ D- B	1400 30 60 50 100 145 40 120 175 65 20 550 65 90 60 20 25 325 300 180 80 600	ANd ANd ANd BSs BSs ANd BSs's ASa ANm ANm BNs's ANd BSs ASl ASa ANc BNs,s BSs ANd+ ANd ANd ANd	
Apr.20	339-359 9-15 26-34 31-66 34-37 69-84 86-95 100-103 112-116 155-158 165-167 188-197 199-204 233-242 243-244 246-253 247-261 267-291 299-311 317-339	N68 N53 N33 N15 N29 S11 S24 S38 S50 S84 S77 S53 S44 S6 0 N6 N14 N35 N60 N77	B+ D- C+ A D+ D- D+ D- D- D- D- D- C D+ D- D- D- D- C+ D+ B	900 10 300 2200 90 20 120 20 70 35 20 25 250 175 10 80 140 300 150 800	ANd BNs's ANd+ ANd+ BSs BNs's AVd ANc ANm ANd BNs BNs's ANc ANd BNs ANd ANd	Flare Arching streamers Reaches high into corona

Date	Spread	Lat. of Center f Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
Apr. 21	320-352	N84	A	2400	ANd	
	25-37	N34	B+	700	ANm?	Flare
	44-66	N14	C	270	ANd	
	108-113	S45	D	100	ANm	
	160-170	S78	D+	135	ANd	
	195-202	S56	B-	550	ANd	Reaches high into corona
	226-246	S12	B	600	ANd	
	254-265	N15	D+	170	ASa	Poor seeing
	266-276	N27	D	85	ANd?	" "
	280-282	N37	D-	25	ANm	" "
	286-310	N51	B-	450	ANd	" "
Apr. 22	14-17	N48	D-	75	ANd	Poor seeing
	24-36	N35	A	800	ANm*	Flare?
	36-44	N24	D-	65	ASa	
	40-49	N20	D	85	ANd*	
	47-55	N14	C	230	ASf	
	65-69	S3	D-	60	ANd	
	85-90	S24	D-	40	ASa	
	104-114	S44	D	90	ANd	
	166-170	S75	D	85	ANd	
	191-201	S51	B	500	ANb	
	220-221	S23	D-	10	BNs	
	228-246	S9	B	700	ANd*	
	249-276	N18	B+	875	ANd	
	288-292	N46	D	90	ANd	
	309-324	N72	D-	35	BNs'	s
Apr. 23	23-42	N37	B+	900	ANd	Poor seeing all day
	44-45	N21	D-	5	BNs	
	47-59	N15	C	275	ANd	
	90-97	S29	D	100	ANd	
	110-112	S46	D-	30	ANc	
	116-117	S52	D-	20	BNs	
	175-190	S62	D-	20	BNs'	s
	219-227	S22	D-	60	ASa?	or ANa?
	232-234	S12	D-	15	ANc	
	239-253	0	C	250	ANd	
	253-273	N15	B	800	ANd	
	273-286	N36	D+	160	ANd	
	286-288	N42	D-	35	ASa	
	289-291	N45	D	30	BSs	
	291-296	N49	D	85	ANd*	
	311-321	N68	D	100	ANd	

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comments
1958						
Apr. 27	341-342	N82	D-	10	BNs	
	357-5	N65	D-	25	BNs's	
	13-22	N46	D-	20	BNs's	
	31-47	N28	C	250	ANd	Poor seeing
	51-54	N13	D	20	BSs?	" "
	54-67	N4	D+	135	ASa	" "
	58-61	N6	D-	20	BSs?	" "
	66-80	S6	C-	210	ASf	" "
	80-94	S21	C	230	ASa	" "
	111-117	S49	D+	125	ANd	" "
	139-140	S78	D-	20	ANc	" "
	159-160	S84	D-	10	BNs	
	169-170	S74	D-	10	BNs	
	196-208	S45	D-	15	BNs's	
	234-236	S10	D	65	BSs?	
	237-240	S7	D-	40	ASa	
	241-246	S3	D	130	ASf	
	254-260	N13	D-	50	ASa	
	261-273	N22	B	800	ANd	
	284-285	N39	D-	5	BNs	
	288-291	N44	D-	15	ANc	
	295-307	N54	D	100	ANd	
	317-323	N73	D	75	ANd	
	334-335	N85	D-	5	BNs	
Apr. 29	7-10	N67	D	50	ANc	
	21-40	N34	C+	375	ANd*	
	39-42	N25	D-	40	ASa	
	41-46	N22	D+	150	BSs?	
	46-60	N10	C+	320	ANd*	
	70-76	S8	D+	110	ANc	
	84-97	S25	B-	500	ANd	
	155-157	S85	D-	35	ANm	
	194-202	S48	D+	130	ANd	
	224-228	S19	D	50	ANm*	
	225-229	S19	D-	40	ASa	
	238-241	S5	D+	150	ASf	
	255-261	N12	D+	125	AS1?	
	273-297	N40	B	700	ANd	
	310-321	N67	D+	115	ANd	

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comments
1958						
Apr. 30	331-4 5-17 21-35 36-48 36-47 53-61 66-75 79-80 83-103 155-157 160-202 202-220 221-227 225-239 247-262 266-270 271-298 305-317	N77 N56 N37 N25 N25 N10 S4 S15 S28 S85 S64 S33 S22 S8 N5 N23 N44 N66	D- C B- D+ D D D+ D- B+ D- D- D- D- D C- D D B+ C	45 225 450 100 80 90 170 15 950 45 65 25 50 275 65 50 1050 200	BNs's ANd ANd# BSs's ASa ANd ANd BSs ANd# ANm BNs's BNs's ANd High in corona ASf ASa ANd ANd ANd	
May 4	337-15 358-8 15-18 32-56 33-40 47-54 49-55 66-71 82-96 116-126 134-142 154-166 167-183 206-221 230-234 249-268 273-277 279-285 287-302 300-336	N72 N52 N49 N24 N30 N14 N13 S2 S23 S55 S71 S84 S71 S31 S14 N11 N29 N36 N49 N70	D- C D- B D D+ D+ D- C- C- D- D- C- D- D- D- C- D- C- D- A D-	60 300 50 750 80 100 140 50 175 180 30 165 15 90 115 375 60 15 1450 20	BNs ANd ANe ASf, f ANd# BSs ASa ANd? ANd ANd BNs's ANd BNs's BNs's ANd ANe ANd ASa BNs's ANd BNs's	Ascending? ASf?
May 9	333-351 353-2 2-9 12-20 20-37 40-63 88-90 95-105 123-131 132-150 153-161 162-165	N85 N79 N61 N51 N39 N12 S22 S35 S59 S72 S87 S83	D- C C- D- B- D- D- B- C D- D	50 375 160 15 600 35 45 500 280 40 85 65	BNs's ANd ANd BNs's ANd BNs's ASa ANd# ANd BNs's ANd ANd	Streamers
Cont.						

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
May 9	207-211	S38	D	65	ANd	
Cont.	215-217	S31	D	15	ANm	
	221-223	S25	D-	40	ASa	
	222-226	S23	D*	100	ASf	
	223-232	S20	D	95	ANd*	
	233-243	S11	D	40	BSs "s	
	235-252	S8	D	180	ASa	Very faint
	253-266	N13	C*	350	ANd	
	260-275	N23	D*	125	ASa	
	275-280	N30	D-	20	BSs	
	278-282	N32	D	75	ASa	
	283-288	N39	D	40	BSs	
	288-305	N46	B-	450	ANd*	Arching streamers
May 10	0-7	N64	D*	150	ANd	
	20-34	N41	B-	550	ANd	
	37-39	N29	D-	25	BSs?	
	49-53	N16	D-	20	ANd	
	59-65	N5	D-	30	?	
	87-104	S28	B-	475	ANd	Arching streamers
	123-129	S59	D	65	ANd?	or BNs's
	139-141	S73	D-	5	BNs's	
	152-166	S87	C	285	ANd	
	186-206	S51	D-	40	BNs's	
	221-222	S26	D-	10	BNs	
	231-232	S16	D-	15	BNs	
	237-238	S10	D-	15	BSs	
	238-251	S2	D-	110	ASa	
	252-258	N7	D	65	ANc?	or BSs?
	267-276	N24	L	70	ASa	
	278-295	N47	B	650	ANd*	Arching streamers
	280-292	N36	C-	150	BSs	
	306-308	N60	D-	10	BNs	
May 11	337-342	N87	D	20	BNs's	
	346-356	N78	D-	2	BNs's	
	357-8	N66	C	280	ANd	
	11-20	N52	D-	20	BNs's	
	19-35	N42	B	600	ANd	
	25-35	N39	D*	215	ANa	
	41-47	N24	D	60	ANd	
	48-56	N14	D-	25	BNs's	
	67-80	S6	D-	30	BNs's	
	88-111	S31	C+	325	ANd	Streamers
	124-146	S68	D-	45	BNs's	
	146-148	S79	D	35	ANm	
	151-159	S86	D	85	ANd	
	160-170	S84	D*	110	ANd	
	174-205	S62	D-	50	BNs's	
	236-245	S9	D	70	BSs	
Cont.	242-251	S2	D	90	ASa	

Date	Spread	Lat. of Center of Intensity ^o	Impor- tance	Area in p.u.	Class	Comments
1958						
May 11	269-273	N23	D	75	ASa?	
Cont.	272-278	N27	D-	15	BSa	
	280-294	N37	C-	300	ASF	
	293-306	N51	D+	110	ANd	
	319-320	N71	D-	15	BNs	
May 13	339-358	N78	D-	30	BNs's	
	359-10	N64	C+	325	ANd	
	15-26	N48	D-	35	BNs's	
	26-28	N41	D	35	BSa	
	29-41	N36	D	115	ASF	
	33-35	N34	D	30	ANe	
	41-49	N22	C+	225	ANd	Flare
	57-66	N8	D	90	ANd	
	80-81	S12	D-	15	BSa	
	81-86	S15	D	60	ANd*	
	83-85	S16	D-	40	ASa	
	96-102	S31	D	70	ANd	
	112-113	S45	D	15	ANm	
	136-147	S68	D-	35	BNs	
	163-167	S82	D	90	ANd	Arch
	183-205	S55	D-	45	BNs's	
	209-225	S32	D-	15	BNs's	
	229-238	S15	C	270	ANd*	
	237-241	S8	D-	35	ASa	
	243-251	S2	D-	30	ANd	
	253-255	N6	D-	20	ASa	
	260-263	N14	D-	50	ASa	
	264-270	N18	D-	20	BSa	
	270-271	N22	D-	20	ASa	
	274-282	N31	D+	100	ANa	
	281-285	N35	C-	165	ANe	
	287-290	N40	D	25	ASa	
	293-309	N51	D+	220	ANd	
	313-319	N67	D-	25	BNs's	
May 18	335-336	N85	D-	20	BNs	
	3-18	N62	B-	500	ANd	
	26-29	N42	D+	110	ANe	
	30-37	N35	D	90	ANd	
	47-84	N4	A	1750	ANd	
	85-87	S16	D-	15	ANm	
	102-107	S34	D	80	ANd*	
	106-118	S42	C+	380	ASF	
	157-162	S88	D-	20	ANd	
	162-203	S68	D-	60	BNs's	
	207-212	S41	D+	140	ANd	
	230-235	S17	D	70	ANd?	
	240-244	S8	D-	30	ANd	
	266-272	N18	D-	30	BNs,s or BSa?	
	276-289	N33	B-	450	ANd	
	296-306	N51	D-	15	BNs's	
	307-319	N63	C	225	ANd	
	329-334	N81	D	40	ANd	

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
May 21	31-48	N33	C+	320	ANd*	Poor seeing all day
	45-49	N23	D+	180	ASf	
	67-74	0	D	115	ANc	
	83-86	S14	D-	25	ANc	
	98-110	S35	D+	100	ANd	
	115-119	S47	D+	120	ANd	
	192-204	S51	C-	280	ANd	
	221-228	S27	D	95	ANd	
	226-233	S20	D-	65	ANa?	
	241-249	S3	D	120	ASf	
	260-261	N11	D-	15	?	
	275-281	N27	D	100	ANd	
	284-295	N41	B	675	ANc	
	304-316	N59	C-	230	ANd	
May 22	31-43	N34	C	200	ANd	Seeing poor all day
	49-50	N22	D-	5	BNs	
	55-57	N15	D-	15	ANd	
	69-76	S1	D+	110	ANd*	
	76-77	S5	D-	45	BSs	
	77-84	S9	D-	60	ASa	
	93-98	S24	D	80	ANd	
	100-114	S36	D+	170	ANd	
	118-121	S48	D	55	ANc	
	159-166	S87	D-	15	BNs *	s
	222-229	S26	D	80	ASa	
	224-226	S26	D-	25	BSs	
	234-238	S15	D	80	ASa	
	245-250	S4	D	60	?	
	274-276	N24	D	40	ANc	
	280-284	N31	D	45	ANm	
	290-296	N41	C+	350	ANc	
	297-299	N4?	D	85	ASf	
	326-327	N75	D	25	ANc?	
May 24	325-339	N84	C	200	ANd	
	341-352	N85	D-	20	BNs *	s
	20-26	N48	D-	15	BNs *	s
	27-42	N37	C-	180	ANd*	
	43-47	N26	D-	40	ASa	
	48-56	N16	D	65	BSs	
	61-65	N8	D-	15	ASa	
	78-92	S17	C-	280	ANa?	or ASa?
	111-127	S47	B-	550	ANd	
	131-147	S6?	D-	35	BNs *	s
	161-201	S71	D-	35	BNs *	s
	201-205	S48	D	65	ANd	
Cont.	214-221	N31	D-	10	BNs *	s

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comments
1958						
May 24	224-234	S22	D+	130	ANd	
Cont.	245-251	S3	D+	125	ANd	
	263-268	N15	D	85	ASA	
	266-268	N16	D-	25	BSs	
	276-283	N28	D	40	ANd	
	285-297	N41	C	25	ANd*	Streamers
	293-299	N45	D	110	ASf	
	300-304	N50	C-	130	ASf	or ANc*?
May 25	7-8	N75	D-	5	BNs	
	18-33	N45	C+	450	ANd	
	43-44	N29	D-	10	BNs	
	51-56	N19	D-	40	ANd	
	69-70	N3	D-	25	?	
	86-93	S18	D-	30	BSs?	
	92-94	S21	D-	40	AS1?	
	110-122	S41	D	100	ANc	
	147-148	S75	D-	20	?	
	154-162	S85	D-	15	BNs?	
	203-204	S49	D-	25	ANm	
	213-218	S37	D	80	ANd	
	221-226	S29	D-	30	ANd	
	232-234	S19	D	40	ASA	
	235-243	S11	D	35	BSs?	
	244-260	S3	C-	250	ANd	
	267-276	N18	D+	280	ANa?	or ASA? very faint
	281-283	N30	D-	40	BSa	
	285-307	N46	B-	650	ASf	
	299-308	N50	C	200	ANd*	
	307-311	N57	D	120	ASA	
	324-340	N78	C+	330	ANd	
May 26	341-345	N88	D	65	ANc	
	7-9	N64	D-	15	BNs	
	19-31	N47	D	250	ANd	
	43-47	N27	D	60	ANd*	
	49-53	N21	D	110	ASA	
	50-55	N21	D	40	BSs	
	63-70	N4	D	160	ASA	
	68-73	N1	D	80	BSs	
	76-86	S7	D-	45	?	
	89-94	S20	D-	90	ANc	
	155-156	S84	D-	15	BNs	
	160-198	S72	D	65	BNs?	
	200-203	S50	D	30	ANc	
	211-235	S31	B-	475	ANd*	
	237-238	S14	D-	15	ASA	
	240-243	S10	D-	20	BSs	
	247-257	S2	C-	170	ANd	
Cont.						

Date	Spread	Lat. of Center of Intensity ^o	Import- tance	Area in p.u.	Class	Comments
1958						
May 30	221-225	S30	D	60	ANd*	
Cont.	225-227	S27	D	35	BSs	
	229-231	S23	D-	25	ASf	
	244-251	S5	D-	70	ANa	
	252-261	N4	D	50	ANa?	
	275-288	N29	C+	390	ANd	
	301-311	N54	D-	25	BNs ¹ *	
	323-333	N78	C	225	ANd	
May 31	322-324	N70	D-	25	ANb?	
	344-345	N89	D-	20	ANe?	
	14-19	N57	D	55	ANd	
	20-29	N50	C	275	ANd*	
	30-31	N43	D-	10	BSs	
	32-56	N33	B	700	ANd	
	63-66	N10	D-	20	ASa	
	67-71	N5	D-	45	ANd	
	88-90	S15	D-	15	BSs?	
	89-92	S16	D-	100	ASa	
	97-99	S24	D-	20	ANc	
	110-141	S55	A-	1000	ANd	
	135-136	S62	D-	5	BNs	
	146-159	S78	D-	15	BNs ¹ s	
	164-165	S90	D-	10	BNs	
	200-201	S53	D-	20	ANm	
	205-218	S44	D-	20	BNs ¹ s	
	219-221	S34	D	50	AS1?	
	228-236	S22	D-	60	ANd	
	243-245	S10	D-	15	ANm	
	251-263	N3	C	270	ANi	
	266-276	N20	D+	120	ANd	
	279-284	N28	D	80	ASa	
	281-290	N32	C+	250	BSs?	
	290-300	N41	D	100	ANd*	
	301-318	N54	C	250	ANd	
June 1	3-4	N71	D-	5	BNs	
	18-37	N44	B	750	ANd	
	36-57	N29	B	625	ANd	
	76-81	S4	D	150	ANa	
	93-100	S24	D-	65	ASa	
	96-106	S28	D-	45	BSs	
	119-129	S50	B-	550	ANd	
Cont.	137-139	S64	D-	10	BNs, ¹ s	

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
June 1	159-194	S77	D-	55	BNs, s	
Cont.	213-220	S38	D-	20	BNs's	
	224-236	S24	C	200	ANd	
	256-262	N5	C	215	ANd?	or ANc?
	271-276	N20	C-	160	BSs	
	277-282	N25	D	85	ASa	
	278-288	N30	C	275	ANd*	
	297-315	N53	C+	500	ANd	
	320-321	N67	D	40	BSs	
	325-337	N75	C-	185	ANd	
July 13	316-341	N59	B	650	ANd	Poor seeing all day
	11-33	N69	B-	450	ANd	
	40-58	N45	D-	25	BNs's	
	60-61	N32	D-	30	ANc?	
	71-80	N17	D+	120	BSs	
	82-83	N11	D-	20	ASa	
	86-91	N4	D	45	BSs	
	95-101	S5	D	70	ASa	
	100-112	S10	D	90	BSs's	
	131-137	S42	D+	120	BSs	
	145-147	S53	D-	25	ANc	
	153-156	S61	D	40	ANd?	
	221-233	S44	C-	180	ANd	
	243-258	S23	C	290	ANd*	
	259-266	S9	D	70	ASa	
	265-275	S3	D	65	BSs's	
	281-282	N8	D-	20	ANc	
	282-284	N10	D-	40	ASF	
	295-311	N30	D+	100	ASa	
	297-307	N30	C-	175	BSs's	
July 14	315-343	N55	A-	1200	ANd	
	19-32	N66	C	335	ANd	
	61-74	N26	C	350	ANd*	
	70-78	N18	D+	110	ASa	
	77-83	N14	D+	120	ASF	
	78-81	N14	D	80	BSs	
	86-94	N3	C-	160	ANc*	
	96-106	S6	C+	400	ANd*	Streamers
	105-112	S15	C-	160	ASa	
	134-139	S44	D+	105	ANd	
	150-157	S59	D-	20	BNs,s	
	225-229	S46	D+	115	ANd	
	255-257	S17	D	60	ASa	
	256-260	S15	D+	120	BSs	
	262-274	S7	C-	180	ANd*	
	286-289	N14	D-	30	BSs?	
	301-309	N31	C	200	ANd	Streamers

Date	Spread	Lat. of Center of Intensity°	Import- ance	Area in p.u.	Class	Comments
1958						
July 18	340-3	N75	B	850	ANd	
	14-15	N79	D-	15	ANb	
	27-31	N65	C	140	ANb	
	37-52	N53	C+	350	ANd	
	52-76	N31	D-	650	ANd	
	75-81	N17	C+	300	ASf	
	78-88	N13	D+	150	ASa	
	80-85	N14	D-	25	BSs	
	94-106	S3	C	375	ANd	
	109-115	S17	D	145	ANd	Arch
	118-146	S37	D+	950	ANd	Arch
	154-185	N75	D-	50	BNs's	
	202-216	S67	D-	20	BNs's	
	218-234	S50	C+	375	ANd	
	246-271	S21	C	250	ANd	
	276-280	N3	D	100	ANd	
	296-303	N25	D-	10	BNs	
	310-319	N39	D	50	BSs?	
	316-317	N42	D-	20	ASa	
	323-331	N52	D	85	ANd	
Aug. 7	336-352	N61	D-	10	BNs,s	
	357-18	N81	B-	500	ANd	
	23-45	N66	B	675	ANd	Arches
	50-56	N50	D-	5	BNs's	
	51-53	N51	D-	20	?	
	61-63	N41	D	35	BSs's	
	64-71	N35	C-	190	ASf	
	74-80	N26	D-	15	BNs's	
	81-91	N17	D+	110	ANd*	
	91-99	N7	C	200	ASa	
	101-118	S5	C+	300	ANd	Flare?
	126-132	S25	D+	150	ASa	
	136-137	S33	D-	10	ASa	
	138-139	S35	D-	5	BSs	
	142-144	S40	D	60	ANd	
	147-161	S49	D-	40	BNs's	
	165-197	S77	D-	20	BNs's	
	204-240	S64	D-	60	BNs's	
	245-267	S26	C-	185	ANd	
	270-293	S2	D-	30	BNs's? or BSs's?	
	278-282	S2	D	35	BSs	
	279-281	S3	D	40	ASa	
	295-304	N18	D+	170	ANd	
	310-319	N31	D	90	ANd?	
	328-335	N49	D-	20	BNs's	

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
Aug. 12	112-116	S9	D-	75	ASf?	
Cont.	117-119	S11	D-	40	ANe#	or ANe?
	118-124	S16	D	80	ASa	
	128-129	S23	D-	5	BNs	
	135-138	S32	D-	5	BNs	
	140-146	S38	D	60	AND	
	146-161	S47	B+	850	AND	
	173-198	S60	D-	25	BNs's	
	205-234	S64	D-	45	BNs's	
	234-241	S47	C-	190	AND	
	244-245	S41	D-	5	BNs	
	246-274	S25	D-	45	BNs's	
	275-280	S7	D	65	BSs,s	
	278-282	S6	D+	150	AS1	
	297-298	N12	D-	30	ANc	
	303-305	N19	D-	10	BNs,s	
	306-312	N22	D	70	AND	
	317-329	N35	B	600	AND	Streamers
Aug. 13	334-343	N52	D-	25	BNs's	
	345-359	N65	B-	450	AND	
	4-27	N83	D-	20	PNs's	
	27-37	N72	D-	25	BNs's	
	38-41	N65	D	130	ANm	
	46-66	N51	D-	25	BNs's	
	71-78	N32	B-	275	AND#	
	78-81	N25	D-	40	ASa	
	79-86	N23	D	80	AND#	
	95-111	N2	C+	350	AND#	
	101-106	N3	D	85	ASa	
	111-126	S12	C	260	AND	
	127-132	S24	D+	95	ANm?	
	148-159	S48	B	950	AND	Ascended
	164-200	S74	D-	35	BNs's	
	205-211	S76	D-	25	BNs's	
	215-234	S61	D-	20	BNs's	
	235-241	S46	C	220	ANm	
	244-261	S33	D-	35	BNs's	
	259-266	S23	D-	180	ANe#	
	266-270	S17	D+	90	BSs's	
	270-274	S13	D-	15	ASa	
	276-282	S7	D	50	BSs's	
	280-287	S2	D	100	AND	
	288-290	N4	D-	25	BSs	
	296-304	N14	D-	30	AND?	
	305-307	N21	D-	20	BSs	
	308-319	N27	D	15	AND#	
	325-331	N43	D-	60	ASa?	

Date	Spread	Lat. of Center of Intensity°	Import- tance	Area in p.u.	Class	Comments
1958						
Aug. 15	334-338	N51	D	100	ASf?	
	338-6	N64	B	700	ANd	
	14-22	N83	D-	15	BNs's	
	35-42	N65	C	225	ANd?	
	48-71	N45	C	200	ANd	
	75-88	N26	C	225	ANd#	
	88-96	N16	D	45	BSs	
	97-101	N7	C	100	AS1	Loop-shaped surge?
	105-106	0	D-	15	?	
	106-115	S4	D-	15	BNs's	
	118-129	S17	D	90	AS1	
	126-128	S21	D-	25	BSs	
	129-145	S31	C+	350	ANd#	
	235-243	S46	C	185	ANd	
	260-272	S17	C	250	ANd	
	280-283	S5	D	70	ANc?	
	284-298	N6	D+	110	ANd	
	303-308	N19	D+	125	AS1	
	308-320	N26	D+	150	ASa	
	320-325	N37	D	65	ANd	
Aug. 16	337-14	N72	A-	1200	ANd	
	15-17	N83	D-	10	BNs,s	
	20-23	N81	D	40	ANc	
	30-33	N73	D	60	ANc	
	34-37	N70	D-	20	ANa	
	39-43	N64	D+	130	ANd	
	44-50	N60	D-	10	BNs's	
	50-59	N53	D+	120	ANc	
	60-73	N41	C+	350	ANd	
	77-102	N19	C+	400	ASa	
	100-102	N5	D-	30	BSs	
	106-117	S6	D	45	BNs's	
	118-126	S16	C	200	ANd?	
	127-134	S23	D-	10	BNs's	
	145-149	S42	D	70	ANd	
	151-169	S58	D-	35	BNs's	
	172-208	S82	D-	20	BNs's	
	209-233	S63	D-	25	BNs's	
	235-244	S47	C	200	ANd	
	253-269	S26	D	75	BNs's	
	270-272	S15	D+	50	BSs	
	277-286	S5	D	95	BSs's?	
	280-281	S5	D-	10	BSp	
	289-297	N6	C+	225	ANd	
	308-317	N28	D-	40	BNs's	
	321-328	N39	D	100	ANd	
	329-336	N45	D-	10	BNs,s	

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comments
1958						
Aug. 26	261-265	S26	D-	50	ANd	
Cont.	270-273	S17	D	40	ANe	
	282-287	S4	D+	150	ANm*	
	290-295	N3	D	75	ASa	
	292-312	N8	C*	350	ANd	
	319-323	N31	D-	80	ASF	
	328-332	N41	D	65	ANd	
Aug. 27	338-0	N59	D-	30	BNs's	
	1-8	N73	C	225	ANd	
	20-28	N82	D-	30	BNs's	
	36-53	N68	B	850	ANd	
	55-59	N53	D	50	BSs's	
	72-79	N34	C-	200	ASf	
	81-89	N26	D	45	ANd	
	94-95	N16	D	40	BSs	
	101-111	N3	D+	210	ANd	Faint streamer
	116-127	S11	D+	120	ANd	
	129-135	S22	D	110	ASa	
	143-145	S34	D	35	ANm	
	150-151	S40	D-	15	BNs	
	160-168	S54	B+	850	ANd	High into corona
	171-207	S74	D-	30	BNs's	
	209-239	S65	D-	65	BNs's	
	252-270	S23	D-	50	BSs's	
	268-272	S20	D-	30	ASa	
	265-290	S18	D	90	BSs's	
	268-286	S17	D	130	ANa	
	291-311	N6	B-	550	ANd	Streamers
	311-319	N27	D	65	ASa	
	320-321	N30	D-	25	ASf	
	328-333	N41	D+	120	BSs?	or ANm?
Aug. 29	319-359	N52	A+	3800	ANd	Fine arch, ascending
	3-11	N74	C+	300	ANd	
	35-59	N62	A-	1450	ANd	
	68-71	N40	D-	30	ASa	
	71-83	N31	D	110	ASf	
	77-90	N27	C-	190	ANd	
	94-95	N16	D-	5	BNs	
	98-108	N8	D+	160	ANd	
	108-116	S5	D	65	ANc	Streamer
	121-129	S16	D-	40	ASa	
	125-127	S16	D-	15	ANm*	
	139-149	S33	C	200	ANd	
	159-177	S57	A-	1500	ANd	High arch
	189-210	S83	D-	30	BNs's	
	213-216	S73	D-	20	BNs's	
	224-225	S65	D-	25	BSs?	or BNs?
	233-247	S50	D-	30	BNs's	
	251-264	S42	C	215	ANd*	
Cont.	266-279	S18	D	65	BSs's	

Date	Spread	Lat. of Center of Intensity°	Import- tance	Area in p.u.	Class	Comments
1958						
Aug. 29	269-274	S18	D	115	AS1	
Cont.	274-287	S10	D	90	ASA	
	299-300	N9	D-	20	BSs	
	303-307	N15	D	65	AND	
	311-318	N24	D	100	BSs	
	313-319	N26	D	125	ASA	
Aug. 31	335-340	N48	D	70	AND	
	342-7	N60	D-	25	BNs's	
	7-25	N80	B-	530	AND	
	26-56	N72	B	1225	AND	
	53-54	N58	D-	15	BSs	
	61-69	N47	C-	170	AND	
	71-81	N36	D+	120	AND	
	92-100	N15	C+	230	AND	
	101-105	N8	D-	15	BNs,s	
	112-127	S8	C	300	AND	
	130-146	S32	C-	190	ASA	
	134-135	S24	D-	15	BSs	
	135-148	S28	D	100	AND	
	162-164	S52	D	85	BSs?	
	164-184	S58	B	1050	AND	or part of AND
	185-206	S82	D-	25	BNs's	
	220-240	S60	D-	20	BNs's	
	265-267	S25	D-	20	BSs	
	270-274	S19	D-	10	BNs,s	
	277-280	S13	D	80	BSs	
	280-293	S5	B-	550	AND#	
	293-307	N9	D	90	AND	
	309-320	N23	D+	125	AND#	
	314-318	N25	D-	20	BSs	
Sept. 1	4-26	N79	B	700	AND	
	42-55	N62	D-	35	BNs's	
	57-67	N47	C	275	ANM	
	72-73	N39	D-	5	BNs	
	74-81	N35	D+	140	AND	
	83-84	N28	D-	5	BNs	
	95-97	N15	D-	25	AS1?	
	99-103	N10	D	55	BSs?	
	109-118	S3	D-	55	ASA	
	122-127	S14	D	80	AND#	
	128-133	S19	D	75	BSs,s	
	136-138	S26	D-	20	ASA	
	161-169	S55	C+	350	ANM	
	176-210	S82	B	650	AND#	
	222-223	S68	D-	60	AS1	
	258-276	S23	C+	375	AND#	
	277-279	S13	D	25	BSs	
	280-284	S9	D-	40	ASA	
	283-308	S2	B	700	AND#	
	329-331	N39	D-	20	AND	Streamers

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
Sept. 6	340-345	N50	D-	50	ANe	Streamer
	352-0	N64	D	90	ANd	
	7-9	N74	D-	30	ANm	
	20-21	N83	D	20	ANm	
	30-52	N71	D-	25	BNs's	
	53-57	N57	D	85	ANb	
	59-60	N52	D-	10	BNs	
	87-90	N23	D-	40	ASa	
	93-96	N18	D-	50	BSs	
	100-111	N6	D	120	ANd	
	119-127	S11	D+	250	ANd	Faint streamer
	135-137	S24	D-	20	BNs	
	169-180	S61	B-	575	ANd	Arching streamer
	182-202	S75	D-	45	BNs's	
	217-245	S62	D-	40	BNs's	
	247-260	S36	D+	150	ANd	
	274-280	S15	D	110	ANd*	Streamer
	281-286	S9	D	100	AS1	
	293-294	N2	D-	10	BNs	
	302-305	N11	D-	30	BSs	
	305-310	N15	D	100	ASg	
	311-319	N23	D+	130	ANd*	
	316-321	N26	C	250	ASf,f	
	321-329	N33	C	225	ASa	
	327-332	N39	D	90	ANd*	
Sept. 14	331-344	N46	B-	600	ANi	Streamer
	352-8	N75	B-	450	ANd	
	13-16	N79	D-	40	ANc	
	16-22	N81	D-	10	BNs's	
	24-27	N83	D	30	ANd	
	29-39	N78	D-	15	BNs's	
	50-52	N63	D-	25	ANc	
	53-59	N58	D-	10	BNs's	
	70-75	N41	D+	130	ANd*	
	76-79	N37	D	60	BSs	
	87-92	N25	D	75	BSs's? or ANd?	
	117-124	S7	D	60	ANe*	
	121-134	S13	C	225	ANd*	Arch
	133-135	S20	D	25	BSs	
	135-138	S22	D	40	ASa	
	143-151	S33	D	110	AS1	
	145-147	S32	D	40	BSs	
	155-177	S52	B-	550	ANd	
	188-198	S78	D-	10	BNs's	
	199-200	S81	D-	20	ANa	
	211-220	S78	D-	10	BNs,s	
	244-248	S48	C-	165	ANd	
	254-267	S35	C	200	ANd	
	277-296	S7	C+	400	AS1	
Cont.	283-287	S8	D-	30	BSs	

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comments
1958						
Sept. 14	293-296	N1	D-	20	BSs	
Cont.	308-320	N24	B+	900	ASf } ANd*	Funnel and hedge-
	317-331	N28	B	950	} ANd*	row intermingled
Sept. 17	334-339	N43	D-	70	ANd	
	346-348	N53	D	65	ANm	
	356-0	N63	D	90	ANd	
	3-7	N70	D	70	ANm?	or BSs?
	7-27	N79	B	850	ANd	
	37-41	N74	D	65	ANd	
	45-51	N66	C-	170	ANb	
	54-72	N53	C+	375	ANd	
	83-102	N22	B-	650	ANd	Streamer
	117-121	S5	D	75	ANd	
	129-133	S17	C	150	ANm?	or BSs?
	145-150	S34	D	100	ANd	
	228-247	S62	C+	375	ANd	
	260-263	S33	D+	100	BSs	
	262-278	F28	C	260	ANd*	
	282-297	0	B-	400	ANc*	Streamer
	306-320	N21	C	375	AS1	
	311-315	N19	D-	80	ANd*	
	315-318	N22	D	65	BSs	
Sept. 24	338-342	N45	D	80	ANm	
	2-6	N68	D+	165	ANc	
	7-10	N73	D+	200	ANa	
	14-15	N78	D-	15	ANa	
	42-48	N69	D+	120	BSs, s?	
	77-82	N37	D	60	ANd*	
	81-86	N32	D	100	BSs?	
	90-94	N23	D	75	BSs?	
	107-114	N4	B-	325	ANc	
	128-134	S16	D	90	ANd	
	141-146	S28	D-	55	ANd	
	148-149	S34	D-	5	BNs	
	166-175	S54	B	375	ANd	Streamers
	196-197	S79	D-	15	BNs	
	243-249	S49	D	75	ANd	
	268-286	S20	0	250	ANd*	
	274-282	S18	C-	200	ASa	
	300-307	N9	D-	70	ANe	Streamer only
	310-329	N27	B	575	ANd	
Oct. 6	56-69	N54	B-	370	ANd	Seeing poor all day
	82-100	N26	B	550	ANd	Arching streamer
	105-120	N2	C+	425	ANd	
	132-141	S21	D	75	ANd	
Cont.	201-202	S82	D-	15	BNs?	or ANm?
	241-258	S46	C+	400	ANd	

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comments
1958						
Oct. 6	268-270	S27	D-	20	ANm	
Cont.	276-289	S15	C	250	ANd	
	290-295	S4	D	75	BSs, s? or ANm, m?	
	298-308	N7	D+	160	ANd	
	316-327	N22	D+	140	ANd	
Oct. 7	334-336	N39	D	45	ANc*	
	338-21	N59	D	65	BNs's	
	25-56	N75	D-	35	BNs's	
	57-60	N58	D	50	ANc	
	65-73	N45	D-	25	BNs's	
	74-81	N40	D+	130	BSs	
	87-88	N28	D-	15	BNs	
	92-98	N20	D	110	AS1	
	98-106	N16	D	90	ASa	
	107-111	N7	D	70	ANd*	
	116-126	S4	C	235	ANd	
	130-155	S20	C-	220	ASa	
	148-150	S33	D-	10	BNs	
	169-205	S68	D-	45	BNs's	
	213-236	S70	D-	45	BNs's	
	239-256	S47	B-	575	ANd	
	261-275	S28	D-	55	ANd	
	279-283	S15	D-	10	BNs,s	
	285-288	S10	D-	30	ANm*	
	288-291	S7	D-	35	BSs	
	288-296	S4	D	110	AS1	
	299-309	N9	D	90	ASa	
	310-314	N16	D	45	BSs? or ANm?	
	318-320	N23	D-	15	ASa	
Oct. 8	8-14	N74	D	90	ANd	
	17-27	N82	D-	15	BNs's	
	51-61	N60	D	105	ANd	
	65-75	N47	D-	15	BNs's	
	78-82	N37	C	250	ANd*?	
	93-97	N26	D+	170	ANd*	
	87-102	N19	D	100	ASa	Streamer
	98-112	N13	C-	200	ANd*	
	121-125	S7	D	40	ANd	
	126-139	S16	D-	55	ASa	Very faint
	137-155	S31	C+	350	ANd*	
	167-170	S52	D	60	ASa	
	174-177	S60	D	55	ANd	
	180-206	S73	D-	35	BNs's	
	243-256	S46	B	525	ANd	
	260-261	S35	D-	10	BNs	
	264-267	S30	D+	100	ANb?	
	267-287	S19	C+	475	ANd	
	311-317	N18	D+	135	ANd	
	321-335	N33	C	225	ANd	
	326-339	N36	B-	450	ASf	

Date	Spread	Lat. of Center of Intensity°	Importance	Area in p.u.	Class	Comment
1958						
Oct. 9	341-343 350-352 13-15 15-19 51-61 77-82 81-86 87-94 97-103 97-105 113-127 128-137 131-141 139-148 147-152 161-162 169-174 175-178 244-255 265-269 274-288 288-292 297-307 317-330 319-325 325-335	N46 N55 N77 N79 N60 N37 N33 N26 N27 N15 S4 S17 S20 S27 S33 S46 S63 S60 S46 S29 S16 S6 N5 N29 N27 N34	D D- D D- C- C+ D D D D- C D- D- D- D- D- D+ D+ C C- D- D- B-	20 10 40 10 180 200 20 65 70 40 250 50 50 200 20 10 20 40 400 100 250 175 20 250 70 500	ASa? BNs, ^s ANm BNs, ^s ANd ANb# or BSs? ASa AND# ASa AND# ASl AND# ASa? BNs, ^s ANm " " " " " " BSs? or ANb? " " AND# Arching streamers ASl BNs, ^s AND# ASa ASf,f	Poor seeing " " " " " " Perhaps only part o prominence because P.A. 315 missing
Oct. 10	325?-344	N30	B	500?	ANd	
	344-13 12-23 41-59 78-84 84-94 87-97 102-110 103-106 110-115 116-121 125-137 140-149 149-156 152-163 170-178 197-224 235-250 255-263 266-272 284-289 285-288 290-296 294-299	N61 N78 N63 N36 N27 N26 N10 N12 N3 S3 S17 S29 S37 S41 S58 S79 S51 S37 S27 S10 S10 S3 0	D- D C C+ D+ D D- D- C+ D- D+ D+ B C D+ D- B- D- D- D- D+ D+ D- D- D- D+	35 80 225 275 175 70 50 20 150 20 190 450 400 200 170 40 120 10 90 50 40 100 170	BNs, ^s ANd ANd ANb#? or BSs? ASl? AND# ANm? BNs, ^s ASa ASl BSs AND# ANd BNs, ^s AND BNs, ^s ASa AND# BSs	Very faint or BSs? Loop shaped

Date	Spread	Lat. of Center of Intensity°	Import- ance	Area in p.u.	Class	Comment
1958						
Oct. 12	6-11 27-29 46-57 59-70 71-80 85-88 99-102 115-121 124-140 174-182 238-249 258-276 276-277 284-285 291-293 304-305 312-316 319-329	N71 N83 N63 N49 N41 N29 N15 S3 S13 S61 S53 S28 S19 S12 S4 N8 N17 N27	D D- C+ D- D D D- D- B- D+ B- B B- D- D- D- D- D	110 40 300 15 90 55 25 10 375 150 425 600 25 15 55 10 70 85	ANd ? ANd ENs's ANd ANc ANd BNs's ANd ANd AND# BSs ASa BSs ANm AS1 ANd	Arching streamer " " Arch Very faint
Oct. 22	339-342 345-346 0-2 13-14 27-35 38-44 46-49 63-65 81-84 89-108 135-140 147-151 166-177 193-198 203-207 263-272 273-291 276-280 292-297 297-307 309-315 315-331	N45 N50 N64 N76 N83 N73 N67 N52 N34 N18 S22 S33 S54 S77 S86 S29 S16 S18 S1 N7 N16 N25	D D- D- D- C- D C- D- D- B- D+ C C+ D D- D- D- B- D- D- C D- B- D- D- D- B-	60 25 30 15 230 100 150 10 15 575 150 170 375 35 25 20 650 100 40 280 50 500	ANd ANa ANm BNs ANd ANd ANb? BNs BNs,s ANd ANd? BSs? ANd ANd ANc? BNs's ANd# BSs ASa ANd# ASa ANd#	Poor seeing all day or BSs? Streamers Dome-shaped
Nov. 18	334-350 3-16 19-21 33-36 44-47 87-108 92-104 108-115 118-129	N52 N78 N87 N77 N65 N12 N13 S1 S13	C C+ D- D- D D+ D D C	280 325 10 30 65 160 100 60 325	ANd ANd BNs,s ANd ANm BSs ASa ASa ANd#	Streamer
(cont.)						

Date	Spread	Lat. of Center of Intensity°	Import- tance	Area in P.U.	Class	Comment
1958						
Nov.18	123-126	S13	D	40	BSs	
Cont.	125-136	S21	D+	180	ASa	
	135-146	S29	C	240	ANd*	
	153-163	S46	C+	290	ANd	
	237-241	S52	D	75	ANd?	
	253-254	S38	D-	10	BNs	
	256-274	S32	C	210	ANd	
	277-303	0	A	1750	ANd	Streamers
	305-316	N21	D+	150	ANd*	
	316-319	N27	D	60	BSs	
	319-323	N30	D-	40	ASa	
	325-332	N38	C	300	ASf	
Nov.19	338-341	N50	D-	10	BNs	
	341-344	N53	D	60	ANc	
	351-352	N61	D	25	ANc	
	353-355	N64	D	35	ANb	
	2-6	N74	D-	10	BNs's	
	6-15	N82	D+	150	ANd	
	18-28	N87	D-	10	BNs's	
	28-35	N79	D-	10	BNs's	
	36-39	N72	D-	35	ANc	
	40-72	N60	D	85	BNs's	
	77-82	N30	D	65	ANd	
	86-88	N23	D	30	BSs	
	89-103	N15	D-	90	ASa	
	91-94	N17	D	30	BSs's	
	101-104	N8	D-	15	ANc	
	110-118	S2	D	105	ANd	Streamer
	120-131	S17	C+	450	AS1	
	122-132	S19	C+	300	BSs's	
	132-140	S25	D+	150	ASa	
	135-145	S31	C	225	ANd*	
	154-161	S47	B-	350	ANd	
	175-195	S74	D-	50	BNs's	
	223-225	S66	D-	10	BNs	
	235-240	S52	D	100	ANd	
	247-253	S40	D-	15	BNs's	
	253-256	S36	D-	40	ANm	
	276-297	S2	A-	1450	ANd	Arch, streamers
	312-315	N24	D-	35	BSs?	
	317-319	N28	D-	20	ANd	
	321-326	N33	D+	135	AS1?	or ANd+ arching streamer?
	325-331	N37	D-	50	ANd	

Date	Spread	Lat. of Center of Intensity°	Import- ance	Area in p.u.	Class	Comment
1958						
Nov. 24	320-342	N46	C+	375	ANd	
	338-343	N51	D+	185	BSa?	or ANb?
	344-0	N61	B	650	ANd	
	27-28	N92	D-	20	ANm	
	39-41	N69	D	75	BSs	
	42-64	N54	D-	80	ANd*	
	67-73	N39	D	90	ASa	
	79-91	N25	B-	400	ANd*	
	91-106	N12	B	500	ANd	Streamers Flare along hedgerow
	103-108	N3	D-	20	ASa	
	107-126	S9	C+	550	ANd*	
	121-127	S15	D	90	ASa	
	127-132	S19	C	300	AS1	
	128-130	S20	D-	45	BSs	
	141-149	S36	C-	140	ANd	
	163-166	S56	D	60	ANm	
	180-182	S72	D	30	ANc	
	192-197	S86	D-	15	BNs?	
	200-201	S87	D-	40	ANb?	
	234-247	S49	C	250	ANd	
	261-271	S22	B-	375	ANd	Streamer
	278-286	S7	C+	235	BSa?	or ANm?
	291-310	N12	B	700	ANd	Streamers
	310-315	N24	D-	75	ASf	
Dec. 3	341-347	N61	D-	15	ANm	Poor seeing all day
	358-3	N76	C-	140	ANm	
	9-10	N85	D-	10	BNs	
	38-62	N60	B	650	ANd	
	64-68	N38	D-	20	BNs?	
	71-77	N31	D+	130	ANd	
	81-82	N23	D-	10	BNs	
	84-90	N17	D+	150	ASa	
	86-89	N17	D	40	BSs	
	90-98	N11	C-	250	AS1	
	97-116	0	C-	170	ANd*	
	109-120	S8	C+	325	AS1?	or ANc?
	120-122	S16	D	40	BSs	
	125-141	S28	C+	400	ANd	
	163-170	S62	C-	160	ANd	
	241-249	S39	C	290	ANc?	
	268-279	S11	B-	500	AS1	
	297-317	N18	D+	180	ASa	
	314-317	N30	D	45	BSs	
	321-331	N39	D-	40	ANd	
Dec. 7	346-21	N74	D-	35	BNs?	
	358-0	N75	D	40	ANm	
	30-42	N67	B-	475	ANd	
Cont.	43-59	N51	D	120	ANd	

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comment
1958						
Dec.7	68-104	N19	D-	30	BNs's	
Cont.	84-86	N19	D-	25	ANc	
	99-100	N4	D-	10	ANe	
	113-121	S13	C	210	ANd*	
	119-128	S19	D	70	ASa	
	146-161	S50	C	300	ANd	
	162-170	S62	C+	300	ANm	
	170-196	S79	D-	40	BNs's	
	208-210	S75	D-	15	ANm	
	218-220	S65	D-	10	ANa	
	224-232	S55	D-	20	BNs's	
	235-242	S47	D	80	ANd	
	255-267	S26	B+	550	BSs	Flare in loop- shaped surge
	268-284	S9	C	150	BSs's	
	268-285	S9	D+	180	ASa	
	280-284	S2	D	100	ASl	
	282-294	N3	D	120	ANd*	
	294-308	N16	B-	400	ANd	
	308-321	N31	C+	325	ANd	
	323-333	N44	D+	125	ANd	
	330-331	N47	D-	20	ANb?	
Dec.15	356-0	N78	D-	35	ANd	
	5-6	N86	D-	5	BNs	
	25-41	N67	C+	375	ANd	
	58-59	N42	D-	5	BNs	
	75-83	N21	D+	120	ANd	Streamer
	92-94	N7	D-	10	ANm	
	97-98	N3	D-	15	ANa?	
	110-113	S12	D-	20	ANc	
	115-116	S15	D-	30	BSs	
	130-132	S31	D-	10	BNs's	
	147-152	S49	D+	100	ANm? or BSs?	
	196-197	S84	D-	5	BNs	
	208-209	S72	D	20	ANm	
	225-231	S51	D+	120	ANm, m Poor seeing	
	267-273	S9	D	80	ASa	
	273-286	0	B-	400	ANd*	
	287-288	N7	D-	20	BSs	
	295-301	N18	D-	50	ANd	
	305-316	N31	D	100	ANd	
	319-337	N47	B	600	ANd	

Date	Spread	Lat. of Cent. of Intensity°	Impor- tance	Area in p.u.	Class	Comment
1958						
Dec.16	355-0	N77	D	85	ANd	
	13-15	N86	D-	10	BNS,s	
	23-42	N67	B	750	ANd	
	48-50	N51	D-	20	ANC	
	56-60	N42	D-	40	BSS	
	78-85	N17	D	115	ANd	
	107-108	S8	D-	10	BNS	
	117-127	S22	D+	180	ANd	
	130-131	S31	D-	5	BNS	
	141-146	S43	D	70	ASA	
	147-151	S48	D	100	ANm	
	194-196	S86	D-	5	BNS	
	215-216	S65	D-	20	BNS	
	226-232	S51	C	175	ANd	
	246-248	S33	D	20	ANC	
	266-269	S13	D	70	BSS	
	270-294	0	B	600	ANd*	Poor seeing
	282-290	N7	D+	190	ASA	Arching streamers
	294-304	N21	D+	150	BSS's	
	304-309	N28	D+	160	ANb*	
	322-338	N49	B-	500	ANd	Streamers
Dec.28	342-353	N74	C	235	ANd	
	25-33	N65	C+	350	ANm	
	55-61	N36	D-	20	BNS's	
	63-67	N29	D	100	ANd	
	71-76	N21	D+	170	BSS	
	72-82	N17	C-	185	ANc*	
	80-90	N8	D	120	BS's	Poor seeing
	80-92	N9	D	110	ASA	" "
	92-98	S1	D+	160	ANd*	" "
	112-114	S19	D-	20	?	" "
	114-130	S27	B-	450	ANd	" "
	151-160	S61	C	325	ANd	" "
	200-204	S72	D-	60	ANa?	" "
	219-222	S54	D-	20	ANm	" "
	223-224	S50	D-	15	ANb?	" "
	232-238	S40	D+	150	ANm	" "
	254-256	S19	D	35	ANm	" "
	261-270	S9	C-	170	ANd*	" "
	264-274	S6	D+	225	ASF?	" "
	278-280	N5	D-	25	ANC	" "
	285-310	N24	A	1450	ANd	" "
	307-329	N45	B	650	ANd	" "

Date	Spread	Lat. of Center of Intensity°	Impor- tance	Area in p.u.	Class	Comment
1958						
Dec. 31	343-0	N77	C+	350	ANd	
	3-24	N78	B-	525	ANd	
	42-50	N47	D	85	ANd	
	51-61	N38	D	75	BSs's	
	66-67	N27	D-	10	?	
	74-87	N12	C	265	ANd	
	89-103	S3	D-	40	BSs's	
	95-97	S3	D-	20	ASa	
	104-114	S16	D+	160	ANd	Very faint
	120-122	S28	D-	35	ASa	
	124-134	S36	D	60	ANd	
	134-144	S48	C	185	ANd	
	145-157	S59	D-	10	BNs's	
	162-200	S86	D-	40	BNs's	
	239-243	S32	C	180	ANm	
	249-255	S22	D	60	ANd*	
	251-258	S18	D	100	ASa	
	276-278	N4	D-	15	ANm	
	284-285	N12	D-	15	ANc	
	288-294	N19	C-	150	AS1	
	292-294	N20	D-	25	BSs	
	292-300	N24	D	80	ANd*	
	303-304	N31	D-	15	ASa	
	318-321	N47	D+	150	ASf?	or ANc?
	322-330	N53	D-	40	ANd	

TABLE II
SACRAMENTO PEAK PROMINENCE FILMS

DATE	P.A.	CLASS	COMMENTS
1958			
Mar. 20	256°	BSs, AS1, ANc	
21	92	BSs, ASa, ANd#, AS1, ANd#	High surge
31	270	AS1, ASa, BSs's	
	275	BSs's, BSp, ASa	
Apr. 11	75	BSs, ANd	
	270	BSs, BSp, ASa, ANd#, BSs, ASa	Flares in small surges
14	270	ASa, ASf, BSs, ANd#	Flare in horizontal surg
20	45	ANd, ANd	Arching streamers
27	265	BSs becomes AS1	Surge material descends in loops
29	70	BSs, ASa, AS1, ANd#	Flare in horizontal surg
May 4	260	ASf? becomes ANd	Funnels perhaps really elevated hedgerow
8	270	ANd#, BSs, ASa, AS1, BSs's, ANd#	Dome-shaped surge flare
9	100	BSs, ASa, ANd#	
	290	ASa, AS1, BSs, ANc#, BSs	
18	65	ANd	Arching streamer
19	65	ANd, BSs, ASa	
20	55	ANd#, ASf, BSs's	
22	53	ANd#, ASa, BSs's, ANd	
30	115	BSs, ANd	
31	283	ASa, BSs, ASa, ANc#	
June 1	33	ANd	
3	97	BSs, ASa, AS1	
4	92	ASf, BSs, AS1, ASa, AS1	Dome-shaped surge flare
	105	ASa, AS1, ANd#	
July 13	85	BSs, AS1, ASa, BSs, ANm#, ANd#	
	250	ANd, AS1, ASa, BSs	
14	82	ANd#, AS1, ASa, BSs, ASf, ANc#, ASf	
26	80	ASa, BSs, ANd	
31	267	ANd#, AS1, ASa, BSs's, ANd	Dome-shaped surge flares and evolves into loops

Date	P.A.	CLASS	COMMENTS
1958			
Aug. 1	55°	ANd*	
	270	ASl	
2	270	ASl, BSs, ANd*	
3	270	ASa, ASl, BSs, Asf,f,f	Triple funnels
4	45	ANd, BSs, ANd	
5	37.5	ANd	Circular streaming
6	125	ANd*, BSs, ASa, BSs, ANd*	Flares in loop-shaped surge
9	292	ASl, ANc*, BSs, ASa	
12	325	BSs, BSs, ASa, ANm	
13	277	Asf, BSs, ASa, ANd*	
	300	BSs*, ASa	
14	75	ANd*, BSs, ASl	
15	95	ANd, ASa, BSs, ASa	
16	90	ANd*, BSs, ASa, BSs	
	270	BSs, ASl, ANc*	
19	345	BSs	Flare
23	90	ASl, BSs, Asf, ANd	
24	90	ASl, ANd*	
Sept. 2	125	ASa, ASl, BSs,s, ANd*	Large dome-shaped surge at base of loops flares
Nov. 18	290	ANd, ANd	Arching streamers to both north and south
Dec. 6	124	ANd*	Flare?
15	290	ANd, BSs, ANd	Arching streamers
20	116	ASa, ASl, BSs	

COMPARISON OF CLASSES FROM SURVEYS AND FILMS

In 1958 motion picture films of the more interesting prominences were made at the Sacramento Peak Observatory on 44 days, on 25 of which surveys were made also. Of the 103 prominences classified in both media at the same position angle on the same date, 82 appeared in both the surveys and the films.

Table III shows the classifications given to the prominences in both surveys and films. Of those seen in both media, 64 or 78.0 per cent were classified identically; 14 or 17.1 per cent were typed as belonging to closely related classes; and 4 or 4.9 per cent otherwise.

The large number (18) of prominences seen in the movies but not in the stills is due to the fact that the movies were studied when the prominence activity was at its peak, whereas there was no choice in the case of the surveys, which are single frame shots of the prominences made either before or after the movies.

TABLE III

COMPARISON OF CLASSIFICATIONS FROM FILMS AND SURVEYS

PROMINENCE TYPES SEEN IN SACRAMENTO PEAK FILMS - 1958

ANALYSIS

In Table IV are tabulated the average number of prominence units per day for the various prominence classes and for each 10° of solar latitude.

Table V lists the average number of prominence units at all latitudes for types A and B, S and N, those unclassed, and for all together, for each third of the year.

Less than one per cent of the total areas were unclassed. Of those classified, 92.7 per cent were assigned to classes in which the prominence material moves downward toward the photosphere; and 16.8 per cent were associated with sunspots.

The northern hemisphere of the sun had 61 per cent of the prominence areas. All types of prominences except the spicules (BNs) showed this preference but the high latitude hedgerows (ANd) were chiefly responsible for the asymmetry.

Prominences denoted with an asterisk in Table I and Table II are those which show interaction with the prominences surrounding a sunspot area. When these are summed we find that 36 per cent of the tree trunks (ANb), 13 per cent of the trees (ANc), 19 per cent of the hedgerows (ANd), 24 per cent of the suspended clouds (ANe), and 14 percent of the mounds (ANm) showed such activity.

TABLE IVa
AVERAGE NUMBER OF PROMINENCE UNITS PER DAY

Class	Northern Latitudes									All N. Latitude	
	90-80	79-70	69-60	59-50	49-40	39-30	29-20	19-10	9-0		
January - April 36 days ^a observations											
ASa					11.6	25.0	30.6	34.4	10.9	112.5	
ASl						1.6	7.6	2.5		11.9	
ASF						5.4	28.1	8.1		41.6	
BSa					1.9	30.0	58.4	11.8	15.0	117.1	
BSp										-	
ANa										-	
ANb					1.6					1.6	
ANC										42.1	
AND	184.5	204.1	408.0	143.6	182.5	243.7	48.4	339.0	65.1	1818.9	
ANE					34.3					34.3	
ANM					2.2	95.4				115.5	
BNS	3.8	8.4	13.8	3.1	1.3	0.5	0.1	3.1	0.6	23.4	
Unclassed									0.6	0.6	
All	188.3	222.5	427.4	148.3	236.6	411.9	144.7	443.6	106.2	2319.5	
May - August 34 days ^a observations											
ASa					3.5	10.4	13.1	48.5	32.8	22.9	
ASl						8.6	3.5	3.7	3.7	19.5	
ASF					8.2	24.9	42.0	47.6	15.0	137.7	
BSa					5.9	1.9	4.8	21.3	17.6	22.9	
BSp									7.9	82.3	
ANa	1.2	0.6					9.3	5.3	16.3	1.5	
ANb	1.2		4.1							5.3	
ANC	4.3	3.4				34.9	6.5	1.2	1.3	64.8	
AND	121.0	169.2	439.2	287.2	220.0	200.7	138.6	94.1	175.5	1845.5	
ANE				1.8			5.6			7.4	
ANM				3.8	3.5	1.5	2.9		0.7	12.4	
BNS	7.8	9.4	3.7	6.0	3.2	2.5	2.6	3.1	0.4	38.7	
Unclassed				0.6	0.6			0.4	2.1	3.7	
All	134.3	183.8	457.3	312.7	299.7	312.5	264.9	190.3	227.2	2382.7	
September - December 21 days ^a observations											
ASa						1.0	20.5	9.3	40.9	19.5	
ASl							6.4	26.4	23.6	2.4	
ASF						7.1	59.5	58.3		124.9	
BSa					9.3	8.8	8.1	32.6	19.5	16.2	
BSp										-	
ANa		10.2							0.7	10.9	
ANb	1.9		16.9	4.0	1.0	22.6				46.4	
ANC		5.0	10.2	7.1		2.1	2.6	10.7	36.4	74.4	
AND	19.5	191.9	185.2	60.2	156.4	93.1	324.8	147.9	203.1	1382.1	
ANE				2.4					3.8	6.2	
ANM	1.9	15.2	36.2	3.1	16.9			7.1	8.8	89.2	
BNS	2.6	8.1	7.4	5.5	2.9	2.9	1.4	1.4	1.4	33.6	
Unclassed	1.9						0.5	1.0		3.4	
All	27.8	230.4	265.2	91.4	193.4	220.4	455.9	252.1	292.3	2028.9	

TABLE IVb
AVERAGE NUMBER OF PROMINENCE UNITS PER DAY

Southern Latitudes											All S Latitude
Class	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90		
January - April 16 days' observations											
ASa	6.2	13.7	28.1	3.1							51.1
ASl		36.9	16.2								53.1
ASF	39.7	18.7									58.4
BSs	5.3	15.3	18.7				0.9				40.2
BSp											-
ANa											
ANb											69.7
ANC	8.1	0.9	90.7	1.2	37.5	31.3	0.9				130.2
AND	124.7	293.5	210.8	56.6	204.1	42.5	12.5	1.2	76.2	1022.1	
ANE				3.1				13.7			3.1
ANm	1.2	5.6		12.5	14.7			1.2	8.4		43.6
BNs	4.7	1.2	5.3	2.5	6.6	4.1	24.7	13.1	0.6		62.8
Unclassed											
All	189.9	385.8	369.8	79.0	278.5	78.8	38.1	29.2	85.2	1534.3	
May - August 34 days' observations											
ASa	31.5	18.5	13.5	5.9	1.8						71.2
ASl	4.4	10.9	1.2	1.5							18.0
ASF	11.6	9.3	3.7		15.0						39.6
BSs	23.4	29.9	7.3	0.1	4.6	2.5	0.7				68.5
BSp	0.3										0.3
ANa	6.5	14.0									20.5
ANb			2.9	0.7	0.7	14.7					19.0
ANC	4.7	19.0	0.6		5.4	1.8	1.3				32.8
AND	94.4	75.4	76.1	118.3	251.0	173.6	4.8		30.5	824.1	
ANE		1.2	5.3	1.8							8.3
ANm	4.9	0.9	3.1	1.5	9.6	15.3		1.0			36.3
BNs	3.5	2.2	4.3	4.8	4.1	6.0	17.4	18.0	5.0		65.3
Unclassed	3.1										3.7
All	188.3	181.3	118.0	134.6	292.2	213.9	24.2	19.6	35.5	1207.6	
September - December 21 days' observations											
ASa	24.5	47.1	20.2		3.8	2.9					98.5
ASl	57.6	59.5	30.9	5.2			2.9				156.1
ASF	10.7										10.7
BSs	31.4	39.3	30.9	33.8							135.4
BSp											-
ANa											4.3
ANb			12.4		0.7			0.5	2.8	1.0	13.1
ANC		1.0		14.8							17.0
AND	174.3	145.2	157.8	61.2	180.7	129.8	75.5	1.7	31.2	957.4	
ANE	2.9										2.9
ANm	1.4	1.7	1.0	17.6	9.5	28.1		1.7			61.0
BNs	1.9	0.5	1.9	3.8		1.4	7.6	11.7	3.6		32.4
Unclassed											-
All	304.7	294.3	255.1	136.4	194.7	162.2	86.5	17.9	37.0	1488.8	

TABLE V
SUMMARY FOR 1958

AVERAGE NUMBER OF PROMINENCE UNITS PER DAY AT ALL LATITUDES

Type	Jan. - Apr.	May - Aug.	Sept. - Dec.
A	3609.7	3327.8	3205.1
B	243.5	255.1	309.2
S	485.9	568.3	783.4
N	3367.3	3014.6	2730.9
Unclassed	0.6	7.4	3.4
All	3853.8	3590.3	3517.7

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<p>AF Cambridge Research Laboratories, Bedford, Mass.</p> <p>AFCR-63-458</p> <p>CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 - 1958, by Donald H. Menzel and F. Shirley Jones. Scientific Report No. 20, April 1963, 44 pp. incl. tables. Unclassified Report</p> <p>This report contains a tabulation and analysis of the behavior classification of prominences observed during 1958 at the Sacramento Peak Observatory, Sunspot, New Mexico. Similar studies for the years 1955, 1956, and 1957 have appeared under this contract as Scientific Reports No. 13, 16, and 17, respectively. A summary report for the analysis of the preceding cycle was issued as Scientific Report No. 12. "Classification of Solar Prominences--XII--Summary for 1944 to 1954."</p>	<p>I. Sun 2. Solar Prominences 3. Astronomical Data</p> <p>APCR Project 7649, Task 764901 Contract AF19(604)-4962</p> <p>II. Harvard College Observatory</p> <p>III. Menzel, D. H. and Jones, F. S. In ASTIA collection</p>
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